fence. Additional wire or fabric at depressions will be measured as additional fence and added to the pay quantity.

Gates, corner assemblies, and double brace assemblies will be measured as completed units of the size and type specified.

752.05 BASIS OF PAYMENT.

The linear feet of fence reset, measured as provided, will be paid for at the Contract Unit Price bid for "Reset Existing Fence." This price shall be considered full compensation for clearing, for removing the existing fence, and for resetting the fence according to this Specification. It shall include the cost of any staples or other fasteners required. Payment for any new posts, braces, or wire furnished as directed by the Engineer shall be the invoice cost of the material, plus tax, plus the transportation charges to which shall be added 25% to cover all other costs and shall be in addition to the price bid per Linear Foot for "Reset Existing Fence."

Payment will be made at Contract Unit Prices for the following:

Pay Item	**Pay Unit**
____Strand Barbed Wire Fence	Linear Foot
Woven Wire Fence	Linear Foot
Chain Link Fence	Linear Foot
Vehicle Gate	Each
Pedestrian Gate	Each
Corner Assembly	Each
Double Brace Assembly	Each
Reset Existing Fence	Linear Foot

This payment will be full compensation for all labor, equipment, and materials necessary to complete the work.

SECTION 754
HIGHWAY SIGNS

754.01 DESCRIPTION.

This work item consists of furnishing, fabricating, and installing highway signs, delineators, and supporting structures.

754.02 MATERIALS.

A. **General.** All materials furnished and used in this work shall be new, and shall meet the Plans, the Standard Drawings, Section 894 of the Standard Specifications, and the following requirements:

Signs, supporting structures, breakaway bases, anchor units, brackets, stringers, and hardware shall be fabricated to meet the dimensions, metal gauge, and bolt holes set forth in the Contract and Standard Drawings. All flat sheet sign backings shall be aluminum with reflective sheeting applied as specified.

The traffic control sign details not otherwise specified shall meet the MUTCD published by the Federal Highway Administration.

All sign faces shall be according to the detail drawings and the alphabets shown in the MUTCD, Standard Highway Signs, and Standard Alphabets, published by FHWA. Sign faces not detailed in these publications shall meet the detailed drawings shown in the supplementary Standard Highway Signs booklet published by the Department.

Regulatory, warning, and guide signs shall be detailed and dimensioned according to detailed drawings of the Standard Highway Signs booklet and Department supplement. These detail drawings are available to the sign fabricator upon request from the Department. Signs not illustrated in these booklets shall be as shown on the Standard Drawings. The last number in the sign numbers shown is the width of the sign required.

Variable message sign dimensions have been computed by the Department of Transportation in order to draft these signs by mechanical means. These message computations have been tabulated and shall be used to lay out these sign faces in the fabricator's shop. These tabulated sheets will be furnished to the Contractor upon request after the Contract has been awarded.

B. **Concrete.** Concrete used in this item of work shall be Class AE Portland Cement concrete mixed and proportioned as specified in Section 802.

C. **Reinforcing Steel.** The reinforcing steel shall meet Section 612.

D. **Delineators.** Delineators shall meet Section 894.06.

E. **Hardware and Fittings.** Signs, supporting structures, breakaway bases, anchor units, brackets, stringers, and all hardware and fittings shall meet Section 894.05 A.

F. **Overhead Sign Structures.** Overhead structures shall meet Section 894.08.

G. **Posts.** Posts shall meet Section 894.05 B.

754.03 CONSTRUCTION REQUIREMENTS.

A. **Locating and Positioning Signs and Sign Structures.**

Each sign and structure shall be located according to the Plans or, where necessary, for maximum effect of the sign. Installed signs and structures will be inspected at night for maximum effect and minimum specular reflection. If any sign exhibits specular reflection or is ineffective at night, the sign shall adjusted at the Contractor's expense.

Signs and delineators located less than 30 feet from the pavement edge shall be erected with the sign face truly vertical and turned 93° away from the center and

direction of travel of the lane which the facility serves. Signs located 30 feet or more from the edge of the pavement edge shall be erected with the sign face truly vertical and aligned 90° from the center and direction of travel of the lane which the offset sign serves. Special attention shall be given to the location and positioning of signs and delineators at the point where lanes divide, or on curves, to avoid specular reflection and to obtain maximum effectiveness of the facility.

B. **Sign Fabrication.**

1. **General.** All sign backing for flat sheet signs shall be aluminum unless noted otherwise, with reflective sheeting applied as specified herein. On large variable message signs the messages, symbols, and borders shall consist of directly applied reflective sheeting cut to desired shapes. The message, symbols and border shall be applied as specified by the sheeting manufacturer.

2. **Fabrication of Sign Backing.** Sign backing shall be cut to size and shape and shall be free of buckles, warps, dents, cockles, burrs, and all defects resulting from fabrication. Signs that are larger than manufacturer's material shall be fabricated in sections with butt joints vertical. The sections shall have a minimum width of 24 inches. If more than two sections of backing are required, the wide sections shall be placed on the outside positions and the narrower one placed in between. The widest manufacturer's sections of aluminum shall be used before narrower sections are used. The surface of all signs shall be plane surfaces.

   All cutting, shearing, and drilling or punching of holes (except mounting holes for demountable letters, numerals, symbols, and borders) shall be completed before metal degreasing and application of reflective sheeting.

3. **Cleaning and Processing.** Cleaning and processing of sign backing shall take place before applying the reflective sheeting. Cleaning and processing shall be performed using the sheeting manufacturer's instructions and recommendations as well as the requirements of Section 894.

   All metal sign backing material shall be handled only by handling devices or clean canvas gloves between cleaning and applying reflective sheeting. Metal shall not come in contact with greases, oils, or other contaminants before application of reflective sheeting. When backing materials are chromate-conversion coated beforehand and are allowed to set for several days before applying reflective sheeting, the application surface shall be given a solvent wipe before reflective sheeting application.

4. **Fabrication of Flat Sheet Signs.** The background of the flat sheet signs shall be screened on reflective sheeting as specified by the manufacturer of the reflective material and as specified herein. Messages, symbols, and borders may be screened on or directly applied reflective sheeting. Directly applied reflective sheeting shall be applied as specified by the sheeting manufacturer. Colors shall meet the requirements of the Contract and as shown in the MUTCD. Care shall be taken so screening inks are compatible with reflective sheeting backgrounds.

   Reflective material shall meet Section 894.02.

   The reflective sheeting used on flat sheet sign backings larger than the manufacturer's material shall have reflective sheeting placed on each section

with no vertical or horizontal splicing of the reflective material on the individual panels. All sheeting on each individual sign shall be from the same manufacturer's lot.

The sign face shall be processed and finished with material as specified by the sheeting manufacturer. Processing of Type III A or III B Reflective Sheeting with screened-on messages shall be accomplished before applying to the sign backing. Processing of Type II Reflective Sheeting may be accomplished before or after applying to the sign backing.

The finished signs shall have a smooth, uniform surface. All letters and numbers shall be clear cut and sharp.

5. **Fabrication of Panel Signs.** The background shall be applied to the panels as specified by the reflective sheeting manufacturer.

   Reflective sheeting shall be overlap spliced. The splice shall be overlapped not less than 3/16-inch, and sheeting applied to panels shall extend over the edges and down the side legs a minimum of 1/16 inch. Splices shall be at a 90° angle to the length of the panel. The splices shall be uniformly and neatly made throughout their entire length. No individual panel shall have more than 2 splices, and the minimum distance between adjacent splices shall be 8 feet.

   When guide sign symbols (e.g. handicap, hospital, and airport symbol signs) are required on larger guide signs as part of the message, the symbol signs shall be riveted to the larger signs and be installed at the locations shown on the plans. The cost of the symbol signs and the labor, equipment, and material needed to attach them will not be bid separately, but will be included in the price bid for the panel or overlay of the sign.

6. **Date of Fabrication.** All signs receiving new sign facings shall be dated with the month and year fabricated. The date shall be placed on the back of the metal backing on the lower corner of sign near the edge closest to traffic so that it can be read from the ground. The dating layout shall consist of 1/4 inch high numbers on a 2-1/4 inches long by 1-3/4 inches high pressure sensitive label. The numbers imprinted on the upper part of the label shall be 1 through 12, with the last two digits of four consecutive years printed across the bottom (as 92, 93, 94, 95). The month and year of fabrication shall be punched out. The label shall meet Section 894.04. The cost of furnishing, fabricating, and installing labels shall be included in the price bid for "Flat Sheet for Signs Type II and III A," "Panel for Signs Type II and III A," "Refacing Signs Type II and III A," or "Overlay Panel Type II and III A."

C. **Packaging, Labeling, Handling, and Shipping.**

Completed signs shall be dry before packaging or storing. Packaged signs that become wet before use shall not be used. A warning label with instructions designed to prevent damage to the signs shall be on the outside of the package, and an additional warning label shall be placed in the packages between the first and second sign, before the last sign, and after each 5 signs in a package. Packaged signs shall not be banded and shall be stored and shipped on edge.

Packaging shall be done so that the signs are protected during storage, shipping, and handling. Packaged signs shall be slipsheeted using the material and methods recommended by the sheeting manufacturer.

Unmounted reflective sheeting may be stacked flat to a maximum height of 5 inches for temporary storage. Otherwise, they shall be stored on edge. The sheeting on signs shall not be exposed to temperatures above 150°F. The slip-sheeting shall be left on the sign face until mounted.

Panel signs may be assembled or separated into sections for ease in handling, storing, and shipping. In lieu of packaging, the sign faces may be turned toward each other and fastened together firmly with sufficient spacers to prevent the sign faces from touching. Sign faces that cannot be protected by packaging or fastening face to face shall have protective covers placed over them.

D. **Label (Handling, Storage, and Installation Instructions).** The label referred to in Section 754.03 C shall contain the following instructions:

1. **Loading on Vehicles.** Signs shall be secured vertically in racks to prevent them from rubbing, scratching, or marring front surfaces. Signs that have protective wrappings or slipsheeting shall be kept dry.

   Signs shall be carefully unloaded, stacked on edge off the ground in an upright position.

2. **Storage at Job Site.** Signs shall be stored indoors and upright on edge to prevent damage to the reflective sheeting.

   Signs shall be kept dry. Packaged signs that get wet will be rejected.

3. **Installation.**

   a. Signs shall be handled carefully and not scuffed or walked on.

   b. Nylon washers shall be used between flat washers and sign face for all Type III and IV reflective sheeted signs.

   c. When washing signs is necessary, a soft bristle brush or sponge and water shall be used.

E. **Erection of Sign Supports and Delineators.**

1. **General.** The Engineer will verify the support lengths on all new sign supports prior to the materials being ordered by the Contractor. All sign supports shall be firmly set and plumb after erection. All concrete foundations shall be constructed as specified, with the top sloped enough to drain away from the sign support. All exposed concrete above ground surface shall be given a rubbed finish. Excess excavation material removed to set sign supports shall be disposed of at the Contractor’s expense. A driving cap shall be used when driving a sign support.

2. **Delineator Posts.** Delineator posts shall be driven without being damaged. If the drilled or punched hole method is used, the hole shall be large enough so the post can be set without damage. Any damage to utilities or structures as a result of construction operations shall be repaired according to Section 105.03.

3. **Anchor for Telescoping Perforated Tubes and Flange Channel Supports.** Anchors for telescoping perforated tubes and flange channel supports shall be driven. The perforated tube anchor shall be driven to a maximum of 4 inches above the ground or sidewalk and 4 inches maximum installed height above ground or sidewalk for flange channel anchor.

   Anchors shall be installed at Plan length, unless the Engineer determines a shorter length is sufficient due to good soil bearing developed when driving the anchor. Anchor lengths may be reduced to a minimum of 3 feet. When set in sidewalk, the anchor plate may be omitted.

   The sidewalk shall be cored to install the anchor unit and the cored area shall be filled with new concrete to restore the sidewalk surface.

4. **Single Tubular Sign Supports.** When a single sign support is required, a Single Tubular Sign Support shall be used. Single Tubular Sign Supports shall be set in a Class AE Portland Cement Concrete base, constructed as shown on the Plans. Breakaway base plates shall be assembled with the bolts torqued to Plan requirements. The plates shall be carefully placed so the tapered bolt slot tapers toward approaching traffic. Either the stub post or the anchor bolt design may be used as detailed. If the anchor bolt design is used, a Portland Cement Grout shall be used to raise the top of the foundation to a snug fit under the base plate.

5. **Overhead Sign Structures.**

   a. **General.** All overhead sign structures shall be shop fabricated so that only bolted assembly is required in the field. Drilling to fasten an overhead sign to a bridge is permitted, but field welding is not permitted. Welders are specified in Section 105.06 D.

   b. **Anchor Bolt Installation.** A steel template shall be used to accurately locate and hold the anchor bolts plumb and in proper alignment. This template shall be in place during placement of the concrete base and shall remain in place a minimum of 24 hours after the concrete placement has been completed. The support cage used to position the anchor bolts within the foundation shall remain in the concrete foundation. Out-of-position anchor bolts and anchor bolts greater than 1:20 out of plumb are cause for rejection of the base. Bending of the anchor bolts to straighten them or move them into position, or alteration of the base will not be permitted, and are cause for rejection of the base.

   c. **Anchor Bolt Tightening.** The top nuts and the leveling (bottom) nuts of the anchor bolts shall be tightened as follows:

      (1) All leveling (bottom) nuts shall be brought to full bearing on the bottom of the base plate. The bottom of the leveling nut must be kept as close to the concrete base as practicable, and shall not be more than one inch above the top of the concrete base. Leveling nuts shall be threaded onto the anchor bolt to provide at least a 1/4 inch projection of the bolt above the top nut when in its tightened position.

      (2) Beeswax or equivalent shall be generously added to the top nut bearing face and top nut internal threads prior to placement on the

anchor bolt. All nuts shall be tightened to a "snug" condition defined as the tightness attained by the **full effort** of a person using a wrench with a length equal to 14 times the diameter of the anchor bolt (minimum length shall be 18 inches). The **full effort** required to achieve a "snug" tight condition shall be applied as close to the end of the wrench as possible, and shall continue until the nut stops rotating. This is achieved by a person leaning back, pulling firmly, and using one's entire body weight on the **end** of the wrench (with feet braced to prevent slipping). This snug tightening shall be accomplished in a minimum of 2 separate passes of tightening. The sequence of tightening in each pass shall be such that the opposite side nut, to the extent possible, shall be subsequently tightened until all the nuts in that pass have been snugged.

"Snug" tightness of the nut shall be checked in the presence of Department personnel after the Contractor has completed nut snugging as described above but prior to commencing step (4) below. "Snug" tightness of the nuts (top and leveling) shall be checked by applying a torque to the nut according to the following values:

Bolt Diameter (inches)	**Torque (foot-pounds)**
1	100
1 1/4	200
1 1/2	300
1 3/4	400
2	500
2 1/4	700
2 1/2	800

(3) After Step (2) has been completed, the top nut and leveling nut must be in full bearing on the base plate. If any gap exists between either nut (top or leveling) and the base plate, a beveled washer shall be inserted between the nut washer and the base plate to eliminate the gap. The washer shall be stainless steel Type 304, shall be the same diameter as the hardened washer, and shall be so beveled that the gap between the nut and the base plate is eliminated. All nuts shall be retightened according to Step (1) and (2) above if beveled washers are added. All costs required to remove and re-erect this structure to install beveled stainless steel washers shall be at the Contractor's expense.

(4) All top nuts shall be tightened an additional 1/3 turn by use of a **hydraulic wrench**. All of the nuts shall be tightened in 2 separate passes of equal incremental turns (1/6 turn each pass). The sequence of tightening in each pass shall be such that the opposite side nut, if possible, shall be subsequently tightened until all the nuts in that pass have been turned. There shall be no rotation of the leveling nut during top nut tightening.

(5) Tightness of the nuts shall be checked in the presence of Department personnel a minimum of 48 hours after the nuts have been rotated

the additional 1/3 turn. Tightness of the nuts shall be checked by applying a torque to the nut in accordance with the following values:

Bolt Diameter (inches)	Torque (foot-pounds)
1	300
1 1/4	630
1 1/2	1120
1 3/4	1820
2	2770
2 1/4	4010
2 1/2	5550

After the anchor bolt nuts have been checked for tightness, ultrasonic testing, and calibration procedures will be performed by the Department for final acceptance. This is to assure that no flaws in the bolts have been introduced during the construction process and no loose nuts or washers exist.

The Engineer will tap each nut (top and leveling) with a 24-ounce ball peen hammer to check for looseness. A tight nut produces a sharp ringing sound, and a loose nut produces a dull sound. The Engineer will tap each washer on one side while placing one hand on the other side of the washer. If the washer moves, the nut is not properly tightened. A wrench with a length equal to 14 times the diameter of the anchor bolt (minimum 18”) will be used by the Engineer to check the tightness of each nut. If a nut rotates as a result of the application of a person’s **full effort** on the end of the wrench, the nut is not properly tightened. If any nut or washer is found loose as a result of the above acceptance procedure by the Engineer, the Contractor shall tighten such loose nuts according to Steps (1) through (5) above. The Engineer will determine the extent of removal, disassembly, and re-erection of the structure. If any nuts require tightening after the initial installation, all costs required to remove and reinstall nuts and washers and, if necessary, to remove and re-erect the entire structure shall be at the Contractor’s expense.

The Contractor must test to verify the absence of flaws prior to the erection stage. Reflectors found with an indication rating less than 15 decibels will be cause for rejection of the entire base installation. Replacement of the base installation shall be done at the Contractor’s expense.

d. **Erection Procedures.** Erection of the overhead sign supports shall be done according to the sequence indicated below. Traffic shall be maintained during erection according to plans and specifications.

(1) Bottom leveling nuts and washers shall be placed on all the anchor bolts. These nuts shall initially be placed 1/4 inch above the concrete foundation. The nuts shall then be brought into level with the highest nut above the foundation Clearance between the concrete foundation and the bottom leveling nuts shall not exceed 1 inch maximum.

(2) The column only, without the truss or arm brackets attached, shall be placed on the leveled bottom nuts and washers.

(3) Beeswax or the equivalent shall be applied to all top nut bearing faces and the top nut internal threads prior to placement on the anchor bolt. The 2 top nuts perpendicular and the 2 top nuts parallel to the sign face (in its final position) shall be placed on the anchor bolts, along with their corresponding washers, and snug tightened.

(4) The column base plate shall be leveled by adjusting only the nuts perpendicular and parallel to the sign face (in its final position).

(5) Remaining top nuts and washers shall be placed on the on the anchor bolts and loosely snug tightened.

(6) All bottom and top nuts shall now be tightened according to Sections 754.03 E.5.c(1) through 754.03 E.5.c(4) above.

(7) The assembled arm bracket or truss, without the sign, shall be placed on the erected column. All bolts shall be tightened by the turn-of-nut method specified in Section 616.03 C.3.c(1) Table 2 of the Standard Specifications. Any nuts and bolts loosened or removed after being fully tightened shall **not** be reused. Previously tightened bolts that have been loosened by the tightening of adjacent bolts will not be considered as reused and may be retightened.

(8) The sign panel shall be placed on the erected arm bracket or truss.

(9) The anchor bolt nuts connecting the column base to the concrete foundation shall now be checked for tightness according to Section 754.03 E.5.c(5) above.

6. **W-Shaped Sign Supports.**

a. The Contractor shall install H-Pile footings for W-Shaped Sign Supports constructed as shown on the Plans. Breakaway base plates shall be assembled with the bolt torqued to Plan requirements. The plates shall be carefully placed so the tapered bolt slot tapers toward approaching traffic. W-Shaped Supports shall use the stub post design.

b. **Flame Cutting of W-Shape Posts.** The gas cutting torch may be used for cutting metals or preparing joints. Carbon steel above 0.30 percent carbon, high alloy steels, heat treated steel, and plated metals shall not be flame cut unless subsequent corrective treatment is provided as approved by the Materials and Research Engineer.

All flame cutting work shall be done by the oxyacetylene gas method or other method approved by the Engineer. The maximum permissible deviation from true lines shall be 1/16 inch. Repairs of edge defects shall be done according to Section 3.2 of AWS Structural Welding Code, as amended by AASHTO Specifications for Welding of Structural Steel Highway Bridges. In general, the roughness of flame cut surfaces shall be no greater than an ANSI roughness value of 1000 microinches. All slag from flame cutting shall be completely removed.

When flange plates or other members are cut to a curve, the curve shall be uniform to the radius required. A series of straight cuts tangent to the curve shall not be acceptable.

When ends of members, which are to take bearing, are cut with a torch a suitable allowance in there length shall be made to permit proper milling or planing.

Joints for welding may be prepared by “flame cutting” or “flame gouging” provided all slag and oxidized metals are removed.

c. **Edge Finishing.** Members formed to specific size by shearing of structural steel plates having a thickness of 1/2 inch or more, shall be machined or planed to correct size by removing not less than 1/4 inch of metal. All field splice plates and stiffeners less than 1/2 inch in thickness shall have a minimum of 1/8 inch of metal removed by machining or planing after shearing.

d. Welding applications as specified in Section 105.06 D.

F. **Mounting Flat Sheet Signs Type III A and III B Sheeting.** Flat sheet signs shall be bolted to the supports and shall have a nylon washer between the flat washer and the sign face. Rubber incased washers may be substituted for nylon washers on work zone traffic control signs specified under Section 704.

G. **Removing and Resetting Signs and Supports.** Existing signs and supports shall be removed and reset as specified. All signs and supports not to be reset shall be stockpiled on the Project Right of Way at designated locations. The stockpiled signs and supports shall remain the Department’s property.

Removed or reset signs and supports that become damaged during removing, resetting, or stockpiling shall be replaced at the Contractor’s expense.

Existing signs and supports shall be removed as construction progresses, and shall be immediately reset or installed. The Contractor shall install new signs or reset signs as shown on the Plans. All signs and supports shall be on the Project site at the time construction begins. The Contractor may choose to temporarily reset existing signs, or temporarily install new signs. The cost of installing and resetting signs temporarily shall be included in the price bid for other items. Any damaged signs or supports shall be replaced at the Contractor’s expense.

H. **Remove Sign Foundations.** This item consists of removing signs, steel pipe supports, and concrete foundations or piling and restoring the surface to match the surrounding area. Concrete foundations shall be removed to a depth of 2 feet below the ground line unless otherwise specified in the Plans. The signs, steel pipe supports, piling, and concrete foundations removed shall become the property of the Contractor and be disposed of outside the highway right of way.

I. **Revise Fuse Joints.** This item consists of removing the existing front fuse plate and back hinge plate and installing a new front perforated fuse plate and a new back hinge plate as shown on the detail sheets in the Plans. All nuts will be tightened securely, torquing is not required.

J. **Overlay Panel Sign Refacing.** This item consists of removing the legend, border, and symbol on those signs that have demountable copy and place overlay panels on the signs. Those signs that have direct applied reflective sheeting legends, borders, and symbols need not have these removed. The new changed legends, borders, and symbols shall be direct applied to the thin metal overlay panels and installed on the existing signs. The legends, borders, and symbols are deemed not salvageable and shall be disposed of by the Contractor outside the highway right of way.

The overlay panels shall be fabricated from 0.063 inch aluminum alloy conforming to ASTM B 209 alloy 6061-T6 or 5052-H38 with mill finish. The overlay panels shall be fabricated according to Section 894.01 and degreased, etched, and coated according to Section 894.01 of these specifications.

The reflective sheeting applied to the overlay panels shall meet the requirements of Section 894.02 of these specifications.

The letters, numerals, symbols, and borders shall be directly applied according to Section 894.04. The Reflective sheeting shall meet the requirements of Section 894.02. Type IIIA reflective sheeting letters, numerals, symbols, and borders shall be used on Type II background. Type IIIA reflective sheeting letters, numerals, symbols, and borders shall be used on Type IIIA background. The overlay panels, after fabrication, shall be installed on the existing signs with aluminum blind fasteners 5/32 inch diameter with 1/8 inch out the back of the existing sign backing or other non-corrosive fasteners approved by the Engineer. The panels are to be butted together with no overlap. Where legends, numerals, symbols, and borders cross the butt joints, they will need to be cut.

Signs that are to be overlaid that are larger than manufactured overlay panels shall be fabricated as follows: Overlay panels shall be a minimum of 18 inches wide and a maximum of 4 feet wide. Panels will have a minimum length of 8 feet. If the overlay panels do not cover the full height of the sign, the overlay panels shall be placed on the lower portion of the sign first so the longer side of the panel is vertical. The remaining panels shall be placed above these panels with their long side placed horizontally. The overlay panels shall be riveted around the panel with the rivets 1 inch from the edge of the panel. The rivets shall be evenly spaced with no more than 12 inches between rivets, horizontally and vertically. Panels more than 24 inches wide shall be riveted down the middle of the panel at 12 inch centers.

K. Auxiliary Signs. The auxiliary signs used with route markers shall be the same background color as the route markers they are used with. (Interstate – Blue, State – White, Interstate Business Loop – Green, and County – Blue.)

754.04 METHOD OF MEASUREMENT.

A. **Flat Sheets, Panels, and Extruded Aluminum Panels.** Flat sheets, panels, and extruded aluminum panels for signs will be measured to the closest 1/10 square foot, complete, in place, and accepted by the Engineer. All hardware, stringers, and brackets required to attach signs to the posts shall be included in the pay item.

B. **Galvanized Steel Posts.**

1. **Galvanized Steel Posts – Telescoping Tube and Flange Channel.** Telescoping Tube and Flange Channel posts will be measured by the linear foot,

complete, in place and accepted by the Engineer. All sizes will be measured and paid for as "Galvanized Steel Posts – Telescoping Perforated Tube or Flange Channel."

The post length shall be measured from the top of the post to bottom of post and top of anchor to the bottom of the anchor, as shown on the Plans. The sleeves and break away base, if included, will not be measured for payment, but will be considered incidental to the cost of the post.

2. **Galvanized Steel Posts – Standard Pipe (single).** Single post signs will be measured by the linear foot of each size installed and accepted by the Engineer. The post length shall be measured from the top of the breakaway base to the top of the post, as shown on the Plans. The concrete base will be paid for separately.

3. **Galvanized Steel Posts – W-shaped Posts (two or more).** W-shaped posts will be measured by the linear foot of each size installed and accepted by the Engineer. The post length, the 12-foot driven pile length, and the 2-foot stub post, as shown on the Plans, will be included in the length of post to be measured and paid for.

C. **Breakaway Bases.** Breakaway bases for standard pipe, W-shape, and telescoping tubes will not be measured, and all hardware, stub posts, slip bases, and assembly will not be measured but will be incidental to the Contract Unit Price bid for posts.

D. **Delineators.** The quantity will be measured by the number of delineators of each type installed, complete with reflectors.

E. **Concrete Foundation.** When concrete foundations are used on single post signs, the concrete will be measured by the cubic yard based on the quantity shown for each foundation complete, in place, and accepted by the Engineer. Reinforcing steel will not be measured but shall be included in the price bid for concrete.

The splices, post caps, plates, bolts, cutting fuse joints, and assembly will not be measured but will be incidental to the post.

F. **Overhead Sign Structure, Various Truss Lengths.** Overhead sign structures' truss lengths as specified will be measured by the number of structures of each length complete in place. The inspection walk (mounting hardware, grating, handrail, etc.) and hardware required for attaching of the inspection walk and assembling the structure shall be included in the price bid to perform this work.

G. **Overhead Sign Structures on Bridges.** Overhead sign structures on bridges will be measured by the number of structures in place. All hardware, supporting structures attached to the bridge, inspection walk, and sign supporting structures shall be included in the price bid to perform this work. The anchor bolts, nuts, washers, and tightening as specified herein will not be paid for separately but shall be included in the price bid "Class AE Concrete – Sign Foundations."

H. **Reset Sign Panels.** The quantity to be paid for will be measured by the number of locations at which a sign, or a sign assembly, has been reset. Signs and assemblies will be measured in place and accepted by the Engineer.

I. **Reset Sign Supports.** The quantity to be paid for will be measured by the number of supports installed, complete, and accepted by the Engineer.

J. **Removed Signs and Supports.** Removed signs and supports will not be measured for payment, but will be incidental to other bid items. Cost of removal shall be included in the price bid for other items.

K. **Remove Sign Foundations.** The item "Remove Sign Foundations" will be measured by the number of foundations removed. The quantities measured will be paid for at the Contract Unit Price, and will be full compensation for all labor, equipment, and material necessary to complete the removal and disposal.

L. **Revise Fuse Joint.** The item "Revise Fuse Joint" will be measured by the number of fuse joints revised. The quantities measured will be paid for at the Contract Unit Price and will be full compensation for all labor, equipment, and material necessary to complete the work.

M. **Overlay Panel.** The item "Overlay Panel" will be measured by the square foot of panel in place and accepted by the Engineer. The quantities measured will be paid for at the Contract Unit Price and shall include all labor, equipment, and material needed to complete the work.

754.05 BASIS OF PAYMENT.

Payment will be made at Contract Unit Prices for the following:

Pay Item	**Pay Unit**
Flat Sheet for Signs, Type II, III A, or III B Reflective Sheeting	Square Foot
Panel for Signs - Type II, III A, or III B Reflective Sheeting	Square Foot
Extruded Aluminum Sign Panels Type III A, and III B Reflective Sheeting	Square Foot
Delineators, Type A, B, C, D, or E	Each
Class AE Concrete – Sign Foundations	Cubic Yard
Overhead Sign Structure, Various Truss Lengths	Each
Overhead Sign Structure on Bridges	Each
Reset Sign Panels	Each
Reset Sign Supports	Each
Galvanized Steel Posts – Telescoping Perforated Tube or Flange Channel	Linear Foot
____" Galvanized Steel Post – Standard Pipe (Single Post)	Linear Foot
____" Galvanized Steel Posts – W-Shaped (two or more)	Linear Foot
Remove Sign Foundations	Each
Revise Fuse Joint	Each
Overlay Panel	Square Foot

This payment will be full compensation for all labor, equipment, and materials necessary to complete the work.